ABSTRACT:

The purpose of this study was to find out the effects of rainfall on traffic flow rates and the implications on highway capacities. Data was generated from a pneumatic tube detector placed on a 2 km straight section of a principal road that was operating in the free flow regime. This is with a view to isolating all bottlenecks and incidences that could affect traffic flows and to see the direct effect of the rainfall on traffic. Data from nearby rain gauge station was used to identify dry and wet traffic flow conditions. Empirical evidence exists for traffic flow contraction, speed reduction and increase in density. A speed reduction of 3.52% resulted in a flow rate change of 8.64% under rainfall conditions. Furthermore, the fundamental diagram was used to predict the capacity flows in both dry and wet conditions. A 42.27% loss of capacity was obtained at critical densities of 186.82 and 111.97 vehs km -1 for both dry and wet conditions respectively. It is concluded that adverse weather can seriously degrade the capacities of highways. At higher flow rates, the instabilities that could result from adverse weather effects can cause prolong delays to drivers with its attendant economic losses. Rainfall intensity variation should be investigated to determine capacity loss thresholds at which resources can be placed to manage traffic in adverse weather.